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HEALTH OF TOWNS COMMISSION.

REPORT

ON THE

STATE OF LANCASTER.

By RICHARD OWEN, Esq.

ONE OF HER MAJESTY'S COMMISSIONERS FOR INQUIRING INTO THE STATE OF LARGE
TOWNS AND POPULOUS DISTRICTS IN ENGLAND AND WALES.

LONDON:

PRINTED BY W. CLOWES AND SONS, STAMFORD STREET,
FOR HER MAJESTY'S STATIONERY OFFICE.

1845.

REPORT on the SANATORY CONDITION of LANCASTER.

By RICHARD OWEN, Esq.

"LANCASTER is pleasantly situated on the south bank of the river Lune;" "the town, being built on rising ground, is remarkable for cleanliness; this, and its proximity to the coast, render its air pure and salubrious, and there is a plentiful supply of good water from the springs."* The sanitary condition of such a town might be expected to be on a par with the best that has been hitherto determined on the basis of accurate registration.

The following Tables, which have been carefully prepared for the present Report by Mr. Grant, Superintendent Registrar of the District, demonstrate an average age at death below that which might have been anticipated from the great natural advantages of the town, where such low average appears not to have been suspected, or to have attracted little attention.

The term "town," used in this and the other Tables, comprises the townships of Lancaster and Skirton (the gaol and lunatic asylum being excluded), and has an area of 2260 acres. The population of Skirton numbers 1665, and with the exception of a small proportion, which is agricultural, is similar to the population of Lancaster.

TABLE I.

POPULATION. Town 14,571 Suburban and Rural 18,876 33,447	Average Age at Death of all who have died.			Average Age at Death of all who have died above 21 Years.		
	Town.	Suburb and Rural.	Total.	Town.	Suburb and Rural.	Total.
Gentry, Professional Persons, and Families }	50.26	49.59	49.94	61.3	65.25	63.07
Tradesmen and their Families . .	30.22	33.63	31.38	52.01	56.06	53.49
Farmers ditto ditto . .	51.66	46.39	46.71	70.36	65.25	65.57
Artisans ditto ditto . .	26.04	30.84	27.28	53.24	54.55	53.62
Agricultural Labourers and Families	33.05	32.61	32.77	52.81	55.74	55.58
General Labourers ditto . .	23.01	24.87	23.37	55.64	54.92	55.49
Factory Hands ditto . .	15.34	13.77	14.8	39.67	43.12	40.65
Weavers—Hand-loom ditto . .	..	29.57	29.57	..	57.1	57.1
Wool-combers ditto . .	..	16.14	16.14	..	39.12	39.12
Fishermen ditto . .	..	25.01	25.01	..	52.05	52.05
Paupers in Workhouse . . .	40.18	49.28	43.38	60.29	68.95	63.51
Averages and Totals . . .	27.87	35.04	31.89	54.44	58.95	57.15

* "An Historical and Descriptive Account of the Town of Lancaster," 8vo. 1807, p. 60. The spring water is hard. The cleanly aspect of the town is heightened by the effect of the white and variegated sandstone of which the houses of the principal streets are mostly built.

TABLE I.—*continued.*

POPULATION. Town 14,571 Suburban and Rural 18,876 <u>33,447</u>	Proportion per Cent. of Deaths from Epidemics.			Number of Deaths upon which the calculations are made.		
	Town.	Suburb and Rural.	Total.	Town.	Suburb and Rural.	Total.
Gentry, Professional Persons, and Families }	5.92	5.04	5.51	135	119	254
Tradesmen and their Families }	13.06	11.79	12.63	375	195	570
Farmers ditto ditto }	13.89	8.	8.36	36	550	586
Artisans ditto ditto }	18.21	12.78	16.81	763	266	1029
Agricultural Labourers and Families }	11.11	11.79	11.74	36	687	723
General Labourers ditto }	20.	13.87	18.78	571	137	708
Factory Hands ditto }	20.54	22.6	21.25	219	115	334
Weavers—Hand-loom ditto }	..	19.05	19.05	..	21	21
Wool-combers ditto }	..	23.07	23.07	..	78	78
Fishermen ditto }	..	18.29	18.29	..	82	82
Paupers in Workhouse }	13.12	4.59	10.12	160	87	247
Averages and Totals }	16.77	11.72	14.22	2,295	2,337	4,632

NOTE.—The calculations in this and the following Tables (Nos. 4 and 8 excepted) are founded upon the deaths which have occurred in the Town during the six years ending June, 1844; and in the suburban and rural parts of the district, during the seven years ending June, 1844.

It appears from the present Table that the factory hands in Lancaster die, on the average, at the age of fifteen years; the general labourers at twenty-three years; the artisans at twenty-six years; and the tradesmen at thirty-years. The per centage of deaths from epidemics is also sufficiently significant of the influences which in Lancaster abridge the term of life, especially in the labouring population.

The following Table demonstrates the excess of the mortality above exhibited, over that experienced among a class exclusively composed of persons in comfortable circumstances.

TABLE II.

POPULATION.	Average premature Loss of Life as compared with the standard of Mortality, actually attained by the Society of Friends, of all who have Died.			Average premature Loss of Life, as compared with the standard of Mortality, actually attained by the Society of Friends, above 21 Years.			Proportion per Cent. of Deaths under 21 Years, to Total Deaths.		
	Town.	Suburb and Rural.	Total.	Town.	Suburb and Rural.	Total.	Town.	Suburb and Rural.	Total.
Town 14,571									
Suburban & Rural 18,876									
33,447									
Gentry, Professional Persons, and their Families }	25	95	57	92	..	..	20	26.05	22.38
Tradesmen	20.29	16.88	19.13	10.21	6.16	8.73	46.13	44.1	45.43
Farmers . . . . .	..	4.12	3.80	..	..	..	30.55	31.27	31.22
Artisans	24.47	19.67	23.23	8.98	7.67	8.60	54.65	44.	52.86
Agricultural Labourers	17.46	17.90	17.74	9.41	6.48	6.64	41.66	46.57	46.19
General Labourers	27.50	25.64	27.14	6.58	7.30	6.73	62.68	59.12	62.
Factory Hands	35.17	36.74	35.71	22.55	19.10	21.57	66.66	73.91	69.46
Hand-loom Weavers . . . . .	..	20.94	20.94	..	5.12	5.12	..	52.38	52.38
Wool-combers . . . . .	..	34.37	34.37	..	23.10	23.10	..	67.94	67.94
Fishermen . . . . .	..	25.50	25.50	..	10.17	10.17	..	56.1	56.1
Paupers in the Workhouse	10.33	1.23	7.13	1.93	..	..	35.62	29.88	33.6
Totals	22.64	15.47	18.62	7.78	3.27	5.07	52.46	44.45	48.42

The following Table exhibits in a striking manner the rates of mortality, as proved by the mean age at death, that prevail among the different classes of the population distinguished as town and rural. The small number of deaths on which the age at death of the gentry is calculated, gives a less certain result as compared with the other classes.

TABLE III.

	Average Age of Total Deaths.								
	Lancaster Town.	Lancaster Rural.	Warton.	Caton.	Wray.	Heaton.	Ark-holme.	Ellel.	Tunstall.
Gentry . .	50.26	62.77	41.5	35.53	58.92	54.68	64.66	45.55	51.37
Tradesmen & Farmers . }	32.1	43.05	44.08	46.05	47.99	29.59	42.62	42.49	45.35
Operatives .	25.15	29.45	33.44	33.76	32.08	24.05	35.48	26.31	29.88
Totals .	27.87	35.44	37.37	37.27	40.97	28.22	40.52	30.94	33.34

	Average Age of Deaths above 21 Years.								
	Lancaster Town.	Lancaster Rural.	Warton.	Caton.	Wray.	Heaton.	Ark-holme.	Ellel.	Tunstall.
Gentry . .	61.3	68.	63.35	56.	66.09	58.7	64.66	51.28	63.33
Tradesmen & Farmers . }	53.88	58.98	63.36	64.48	64.68	61.45	65.51	64.35	60.85
Operatives .	53.55	53.75	55.46	61.9	54.85	54.76	60.43	51.14	56.45
Totals .	54.44	56.85	58.83	62.28	61.37	56.97	63.74	55.55	59.47

	Proportion per Cent. of Deaths from Epidemics.								
	Lancaster Town.	Lancaster Rural.	Warton.	Caton.	Wray.	Heaton.	Ark-holme.	Ellel.	Tunstall.
Gentry . .	5.92	7.7	9.3	11.76	..	..	..	..	..
Tradesmen & Farmers . }	13.13	4.59	8.8	8.04	7.61	17.39	5.08	11.97	5.40
Operatives .	18.44	11.76	14.05	7.61	12.84	14.77	2.56	17.94	2.32
Totals .	16.77	9.25	12.07	10.06	9.69	14.14	3.96	16.06	3.41

NOTE.—The Average Age at Death in the Caton District, exclusive of the Workhouse inmates, is, Total Deaths, 2.93; above 21 Years, 59.02.

The population of each of the above Districts may be obtained from Table IV.

In Table III., Lancaster Rural comprises the townships of Aldcliffe, Halton-with-Aughton, Ashton-with-Stodday, Scotforth, Bulk, Slyne-with-Hest, and Hest, and has an area of 11,200 acres. The population is almost wholly agricultural. Out of the 115 deaths of factory hands mentioned in Table I., 15 belong to this district.

Warton comprises the townships of Warton-with-Lindeth, Yealand Redmayne, Yealand Conyers, Dalton, Borwick, Priest-Hutton, Carnforth, Silverdale, Bolton-by-the-Sands, Over Kellet, and Nether Kellet. It embraces an area of 19,120 acres, and its population is principally agricultural. The hand-loom weavers referred to in Table I. belong to this district.

TABLE IV.

Registrars' Districts.	Population.	Number of Births in Seven Years.	Number of Deaths in Seven Years.	Proportion per Cent. per Annum of Births on the Population.	Proportion per Cent. per Annum of Deaths on the Population.	Proportion per Cent. of Bastards born to Total Births.
Lancaster, Town . . .	14,571	3,302	2,669	3·24 or 1 in 30·89	2·62 or 1 in 38·21	8·055
Lancaster, Suburban and Rural . . . }	2,060	378	270	2·62 or 1 in 38·15	1·87 or 1 in 53·41	8·677
Warton	3,780	704	497	2·66 ,, 37·58	1·83 ,, 53·24	10·937
Caton	1,964	487	328	3·54 ,, 28·23	2·38 ,, 41·91	6·753
Wray	2,309	485	227	3· ,, 33·33	1·40 ,, 71·20	7·01
Heaton	2,468	552	297	3·15 ,, 31·31	1·72 ,, 58·16	5·435
Arkholme	1,017	119	101	2·79 ,, 35·07	1·42 ,, 70·49	11·055
Ellel	4,452	1,081	529	3·47 ,, 28·83	1·69 ,, 58·91	6·011
Tunstall	826	172	88	2·97 ,, 33·62	1·52 ,, 65·71	11·046
Totals of Rural Districts . . . }	18,876	4,058	2,337	3·07 or 1 in 32·56	1·77 or 1 in 56·54	7·663
Totals of Town and Rural Districts . }	33,447	7,360	5,006	3·14 or 1 in 31·81	2·14 or 1 in 46·77	7·840

NOTE.—The proportion per cent. per annum of Births in the Caton District, exclusive of the Workhouse Inmates, is 3·35, or 1 in 29·84; and the Deaths 1·83, or 1 in 53·56.

Caton comprises Caton, Cloughton, and Quernmore; has an area of 16,150 acres, and a population partly manufacturing and partly agricultural. Forty-two out of the 115 deaths of factory hands alluded to above, occurred in this district.

Wray comprises the townships of Wray-with-Bolton, Melling-with-Wrayton, Hornby, Wennington, Roberindale, Forleton, and Tatham, and has an area of 24,790 acres. A little manufacturing is carried on at Wray, but the population of the district is principally agricultural. Out of the 115 deaths of factory hands above alluded to, 17 have occurred in this district.

Heaton comprises the townships of Heaton-with-Oxcliffe, Heysham, Middieton, Poulton-Bore-and-Townsholme, and Overton; and has an area of 6930 acres. The fishermen alluded to in Table I., with the exception of a few in the Warton District, belong to this district, otherwise the population is agricultural.

Arkholme comprises the townships of Arkholme and Cawood, Whit-tinton, Docker, and Gressingham, having an area of 9120 acres, with a population agricultural.

Ellel comprises the townships of Ellel, Over Wyersdale, Thurnham, and Cockerham, and embraces an area of 29,130 acres. The wool-combers mentioned in Table I. belong to this district, and 41 out of the 115 deaths of factory hands mentioned in the said Table, also belong to this district. The population is partly manufacturing and partly agricultural.

Tunstall comprises the townships of Tunstall, Lock, Ireby, Caulsfield, and Burrow-with-Burrow; has an area of 10,780 acres, and an agricultural population.

Tables V., VI., VII., are formed from deaths which have occurred in

the Lancaster Town District during the six years ending June 1844. In order to bring the facts involved in the above numbers more forcibly to the mind, through the eye, three diagrams, showing the periodic diminution of the sum of vitality, from birth to the latest term of existence, in the respective classes of gentry, tradesmen, and operatives, accompany these tables. The curves are formed from the registers of deaths in the six years ending the 30th of June, 1844.

TABLE V.

PERIODS OF DEATH. From Birth.		GENTRY.			TRADESMEN.		
		Deaths per Cent. between each Period.	Total Deaths per Cent. at the end of each Period.	Remaining at the end of each Period per Cent.	Deaths per Cent. between each Period.	Total Deaths per Cent. at the end of each Period.	Remaining at the end of each Period per Cent.
At 6 months .		6.62	6.62	93.38	11.594	11.594	88.406
„ 1 year . .		2.2	8.82	91.18	3.381	14.975	85.025
„ 2 years . .		1.47	10.29	89.71	5.797	20.772	79.228
„ 5 „ . .		2.2	12.49	87.51	9.42	30.192	69.808
„ 10 „ . .		2.2	14.69	85.31	5.797	35.989	64.011
„ 20 „ . .		6.62	21.31	78.69	7.246	43.235	56.765
„ 30 „ . .		6.62	27.93	72.07	7.488	50.723	49.277
„ 40 „ . .		5.148	33.08	66.92	7.488	58.211	41.789
„ 50 „ . .		11.04	44.12	55.88	10.357	68.568	31.402
„ 60 „ . .		10.295	54.41	45.59	8.213	76.811	23.189
„ 70 „ . .		10.295	64.71	35.29	9.179	85.99	14.01
„ 80 „ . .		19.852	84.56	15.44	9.179	95.17	4.83
„ 90 „ . .		13.97	98.53	1.47	4.348	99.517	.483
„ 100 „ . .		1.47	100.	..	.483	100.	..
		Terminates at 95 years.			Terminates at 93 years.		
		OPERATIVES.			THE THREE CLASSES.		
At 6 months .		15.341	15.341	84.659	14.149	14.149	85.851
„ 1 year . .		8.301	23.642	76.358	7.052	21.201	78.799
„ 2 years . .		8.472	32.114	67.886	7.575	28.776	71.224
„ 5 „ . .		11.849	43.963	56.037	10.84	39.616	60.384
„ 10 „ . .		5.724	49.687	50.313	5.529	45.145	54.855
„ 20 „ . .		6.526	56.213	43.787	6.661	51.806	48.194
„ 30 „ . .		7.442	63.655	36.345	7.4	59.206	40.794
„ 40 „ . .		6.64	70.295	29.705	6.71	65.916	34.084
„ 50 „ . .		5.201	75.496	24.504	6.486	72.402	27.598
„ 60 „ . .		5.782	81.278	18.722	6.487	78.889	21.111
„ 70 „ . .		6.928	88.206	11.794	7.532	86.421	13.579
„ 80 „ . .		7.9	96.106	3.894	8.834	95.255	4.745
„ 90 „ . .		3.32	99.426	.574	4.136	99.391	.609
„ 100 „ . .		.516	99.942	.058	.566	99.957	.043
		Terminates at 100 years.			Terminates at 100 years.		

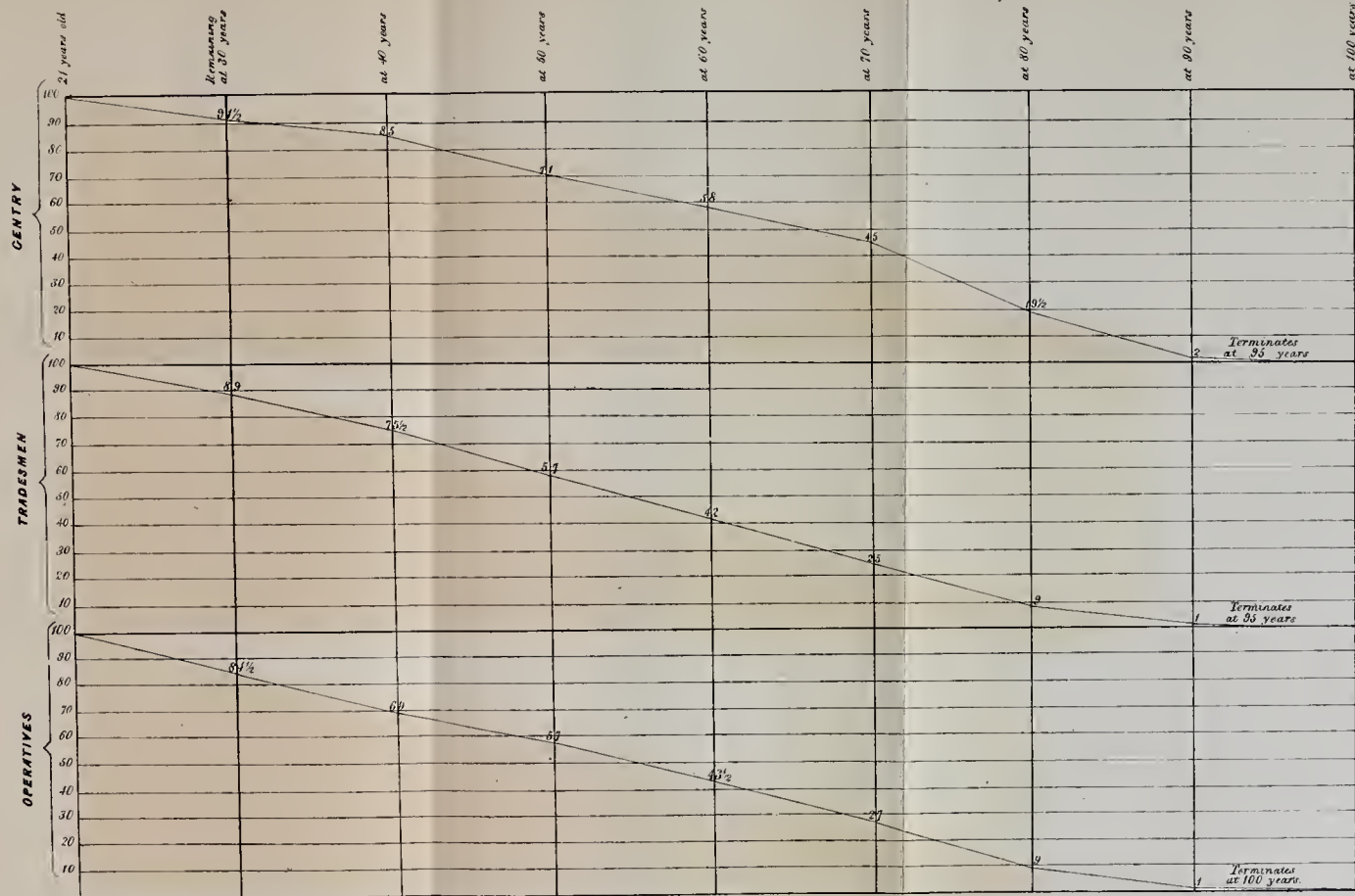
In Table V. it will be seen, that in the third class of inhabitants, the stream of life has been deprived of half its volume when it has run through only one-tenth part of its course; and although the difference which the first class manifests in this respect is in part explicable on

TABLE, NO. V.

COMPARATIVE TABLE SHOWING THE DURATION OF VOYAGE AND OF STAY IN PORT, STATE OF WEATHER, AMOUNT OF FOOD, AND NUMBER OF CASES OF KAK'KE DURING THE VOYAGES MADE BY THE *RYUJŌ* & *TSUKUBA* TO SOUTH AMERICA.

PERIOD.		DATE.	VOYAGE.	DURATION OF VOYAGE OR STAY.	TEMPERATURE. (FAHR.)	BAROMETER	WEATHER.	DAILY AMOUNT OF FOOD TAKEN BY ONE PERSON.	CASES OF <i>Kak'ke</i> .
Voyage of <i>Ryujō</i> (1882-1883).	1 st PERIOD.	Dec. 19, 1882 to Jan. 31, 1883.	Shinagawa to Wellington.	Voyage. 44 days Stay. ..	66-87	29.75-30.19	Clear. 16 days Fair. 17 " Cloudy. 8 " Rain. 3 "	Animal. 25.57 Vegetable. 351.97	3
	2 nd PERIOD.	Feb. 1, 1883 to Mar. 31.	Wellington to Valparaiso.	Voyage. 44 Stay. 15	67.5-74	29.98-33.26	Clear. 11 " Fair. 25 " Cloudy. 15 " Rain. 8 "	Animal. 37.63 Vegetable. 276.70	7
	3 rd PERIOD.	Apr. 1 to May 31.	Voyage continued; stay at Valparaiso; to Callao stay at Callao; to Honolulu.	Voyage. 39 Stay. 22	67.5-79.7	27.62-30.16	Clear. 29 " Fair. 16 " Cloudy. 13 " Rain. 3 "	Animal. 33.07 Vegetable. 290.89	25
	4 th PERIOD.	Jun. 1 to Jul. 31.	Voyage continued; stay at Honolulu.	Voyage. 32 Stay. 29	81.5-83.8	29.99-30.18	Clear. 47 " Fair. 13 " Cloudy. 6 " Rain. ..	Animal. 61.68 Vegetable. 279.99	125
	5 th PERIOD.	Aug. 1 to Sept. 15.	Stay at Honolulu; to Shinagawa.	Voyage. 42 Stay. 4	81.8-86.0	26.30-33.56	Clear. 1 " Fair. 34 " Cloudy. 5 " Rain. 1 "	Animal. 69.95 Vegetable. 223.28	..
	TOTAL 271 days.				Voyage. 201 Stay. 70	Max. 87 Min. 66	Max. 33.56 Min. 26.30	Clear. 104 " Fair. 105 " Cloudy. 47 " Rain. 15 "	Animal. 12,623.18 Vegetable. 77,118.47	160
Voyage of <i>Tsukuba</i> (1884).	1 st PERIOD.	Feb. 3, 1884 to Mar. 31.	Shinagawa to Auckland; stay at Auckland.	Voyage. 48 Stay. 9	63-98	30.98-30.13	Clear. 24 " Fair. 16 " Cloudy. 10 " Rain. 7 "	Animal. 125.59 Vegetable. 363.12	5
	2 nd PERIOD.	Apr. 1 to May 31.	Stay at Auckland; to Valparaiso.	Voyage. 41 Stay. 20	69-74	29.89-29.98	Clear. 29 " Fair. 20 " Cloudy. 10 " Rain. 2 "	Animal. 125.91 Vegetable. 351.43	7
	3 rd PERIOD.	Jun. 1 to Sept. 31.	Voyage continued; stay at Valparaiso; to Coquimbo; stay at Coquimbo; to Honolulu.	Voyage. 30 Stay. 31	68-70	27.71-30.86	Clear. 31 " Fair. 13 " Cloudy. 12 " Rain. 5 "	Animal. 114.66 Vegetable. 342.62	1
	4 th PERIOD.	Aug. 1 to Sept. 30.	Voyage continued; stay at Honolulu.	Voyage. 50 Stay. 11	74-83	27.99-32.97	Clear. 30 " Fair. 15 " Cloudy. 13 " Rain. 3 "	Animal. 114.87 Vegetable. 308.83	3
	5 th PERIOD.	Oct. 1 to Nov. 16.	Stay at Honolulu; to Shinagawa.	Voyage. 39 Stay. 8	75-84	33.37-29.68	Clear. 17 " Fair. 12 " Cloudy. 16 " Rain. 2 "	Animal. 126.88 Vegetable. 324.38	..
	TOTAL 287 days.				Voyage. 208 Stay. 78	Max. 98 Min. 63	Max. 33.37 Min. 27.71	Clear. 131 " Fair. 76 " Cloudy. 61 " Rain. 19 "	Animal. 34,893.46 Vegetable. 97,017.48	16

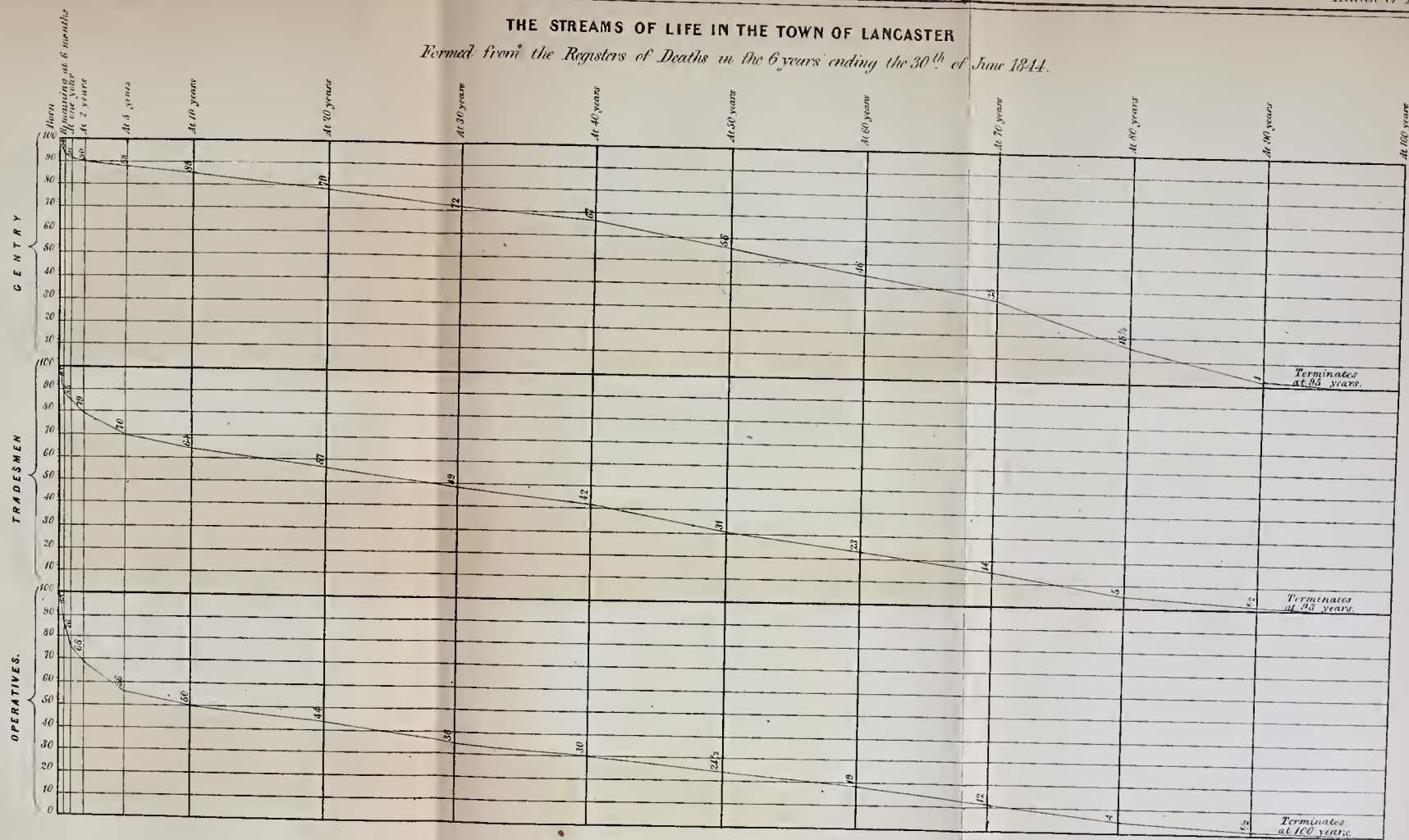




THE STREAMS OF LIFE IN THE TOWN OF LANCASTER.

Formed from the Registers of Deaths in the Six Years ending June 30th 1844

THE STREAMS OF LIFE IN THE TOWN OF LANCASTER

Formed from the Registers of Deaths in the 6 years ending the 30th of June 1844.

the greater care bestowed by the rich upon their offspring, yet it is too extreme not to lead to inquiry into the more general causes, connected with the state of the dwellings of the labouring classes, which may operate in producing the excessive infantile mortality thus indicated.

TABLE VI.

PERIODS OF AGE. From 21 Years old.	GENTRY.			TRADESMEN.			OPERATIVES.		
	Deaths per Cent. between each Period.	Total Deaths per Cent. at the end of each Period.	Remain- ing at the end of each Period per Cent.	Deaths per Cent. between each Period.	Total Deaths per Cent. at the end of each Period.	Remain- ing at the end of each Period per Cent.	Deaths per Cent. between each Period.	Total Deaths per Cent. at the end of each Period.	Remain- ing at the end of each Period per Cent.
At 30 years	8.411	8.411	91.589	10.917	10.917	89.083	15.334	15.334	84.666
„ 40 „	6.542	14.953	85.047	13.537	24.454	75.546	15.467	30.801	69.199
„ 50 „	14.02	28.973	71.027	18.777	43.231	56.769	12.133	42.934	57.066
„ 60 „	13.084	44.057	55.943	14.847	58.078	41.922	13.467	56.401	43.599
„ 70 „	13.084	57.141	42.859	16.594	74.672	25.328	16.133	72.534	27.466
„ 80 „	25.233	80.374	19.626	16.594	91.266	8.734	18.40	90.934	9.066
„ 90 „	17.757	98.131	1.869	7.86	99.126	.874	7.733	98.667	1.333
„ 100 „	1.869	100.	..	.874	100.	..	1.2	99.867	.133
	Terminates at 95 years.			Terminates at 93 years.			Terminates at 100 years.		

TABLE VII.

PERIODS OF AGE. From 30 Years old.	GENTRY.			TRADESMEN.			OPERATIVES.		
	Deaths per Cent. between each Period.	Total Deaths per Cent. at the end of each Period.	Remain- ing at the end of each Period per Cent.	Deaths per Cent. between each Period.	Total Deaths per Cent. at the end of each Period.	Remain- ing at the end of each Period per Cent.	Deaths per Cent. between each Period.	Total Deaths per Cent. at the end of each Period.	Remain- ing at the end of each Period per Cent.
At 40 years	7.148	7.148	92.852	15.197	15.197	84.803	18.268	18.268	81.732
„ 50 „	15.303	22.451	77.549	21.079	36.276	63.724	14.330	32.598	67.402
„ 60 „	14.285	36.736	63.264	16.666	52.942	47.058	15.905	48.503	51.497
„ 70 „	14.285	51.021	48.979	18.627	71.569	28.431	19.056	67.559	32.441
„ 80 „	27.551	78.572	21.428	18.627	90.196	9.804	21.733	89.292	10.708
„ 90 „	19.387	97.959	2.041	8.823	99.019	.981	9.134	98.426	1.574
„ 100 „	2.041	100.	..	.981	100.	..	1.417	99.843	.157
	Terminates at 95 years.			Terminates at 93 years.			Terminates at 100 years.		

Table IX. will convey some idea of part of the expense entailed upon a town during the continuance of those causes which tend to undermine the health and abridge the life of the labourer and artisan, and which may be removed by improved sanatory, and therefore more economical, regulations.

Mr. Grant, the able Superintendent Registrar, to whom I am indebted for the foregoing and following tables, informs me that the Lancaster Poor Law Union, and the Superintendent Registrar's district of Lancaster, are not, as usual in other places, co-extensive; and that Table IX. has reference to the Lancaster Union only, comprising 19

townships, with a population of 23,943 : it is also formed from cases of widows and orphans *resident* in the Lancaster Union, without any reference to their place of settlement, and it includes such only.

TABLE VIII.

Different RATES of MORTALITY prevalent during SEVEN YEARS, among several Classes of MALE OPERATIVES above 21 Years of Age, in the Town of LANCASTER.

TRADES.	Number of Deaths.	Average Age at Death.	Number of Deaths from Epidemics.	Proportion per Cent. of Deaths from Epidemics to Total Deaths.
IN-DOOR.				
Tailors	16	45.06	1	6.25
Shoemakers	23	58.91	3	13.04
Joiners and Wheelwrights . . .	17	54.23	1	5.88
Cabinet-makers	16	51.68	..	..
Black and White Smiths . . .	15	44.13	..	..
Factory Hands	31	37.26	3	9.67
Miscellaneous	56	49.73	2	3.63
Totals	174	48.43	10	5.74
OUT-DOOR.				
Stone Masons	29	39.79	3	10.34
Stone Quarrymen	7	53.85	..	..
Agricultural Labourers	11	62.72	1	9.09
General Labourers, chiefly employed out-door	70	58.92	7	10.
Seamen	18	62.55	..	..
Miscellaneous Out-door Workmen.	57	54.52	..	..
Totals	192	55.1	11	5.72
In and Out-door Totals	366	51.9	21	5.73

Although the low average age of death in the classes of tradesmen, artisans, and labourers, appears not to have attracted due attention, the proneness to the development of epidemics, especially of more or less malignant forms of fever, in the town of Lancaster, has been long recognised, and has led to charitable institutions for the reception, relief, and insulation of such cases of disease.

I received concurrent testimony from several medical practitioners of the town, that such fevers were seldom absent from certain localities, to be specified hereafter : and they have occasionally spread and prevailed to an alarming degree, and have been the subject of special description.

Dr. Campbell, a highly esteemed physician, who practised his profession during more than half a century in Lancaster, thus notices, in a pamphlet published in 1785, one of those typhoid epidemics which ravaged the town in the years 1782 and 1783 :—

“A fever of the particular species, which is mentioned in the foregoing chapters, was epidemic at Carlisle, in the year 1781 ;* but I did not see any person affected with it at Lancaster until the summer of 1782.

* Heysham on the Jail Fever.

Whether it was originally produced here, or imported from a distance, I was unable to ascertain; the houses in which it first appeared being equally favourable for either supposition. From that period to the present, it has continued to rage with more or less frequency and fatality. It has, with few exceptions, been confined to the poor and labouring classes of people: but when persons in better life were attacked, the symptoms were not less severe than with others. The seasons or weather seemed to have little influence either in extending or retarding its progress: sometimes we had many persons labouring under the disease; at other times, it would almost totally disappear, and then break out again, generally in families, whose intercourse with others who had been sick afforded a ready conveyance for contagion.

TABLE IX.—LANCASTER UNION.

WIDOWS.			£.	s.	d.	
Total Number of Widows at present chargeable, on account of widowhood, whose Husbands, had they been living, would now have been under 60 years of age	91	..	.	.	.	..
Total Number of Children under 16 years of age, dependent upon them	241	..	.	.	.	..
Average Period of Chargeability actually experienced by them . . . . .	..	5.1	.	.	.	..
Annual Cost . . . . .	..	..	650	0	0	..
Cost per Cent., in proportion to the Annual Total Cost of Paupers . . . . .	..	..	.	.	.	13.88
Average Age at death of the Husbands of the above widows . . . . .	..	38.55	.	.	.	..
<hr/>						
Total Number of Widows at present chargeable, whose Husbands, had they been now living, would have been 60 years of age, and upwards	104	..	.	.	.	..
Average Period of Chargeability actually experienced by them . . . . .	..	7.02	.	.	.	..
Annual Cost, including their 14 Children . . . . .	..	..	468	0	0	..
Cost per Cent., in proportion to the Annual Total Cost of Paupers . . . . .	..	..	.	.	.	10.
Average Age at death of the Husbands of these Widows . . . . .	..	62.65	.	.	.	..
<hr/>						
ORPHANS.						
Total Number of Children under 16 years of age, both of whose Parents are dead; the Fathers, had they been now living, would have been under 60 years of age	55	..	.	.	.	..
Average period of Chargeability actually experienced by them . . . . .	..	2.51	.	.	.	..
Annual Cost . . . . .	..	..	234	0	0	..
Cost per Cent., in proportion to the Annual Cost of Paupers . . . . .	..	..	.	.	.	5.0
Average Age at death of the Fathers of these Children . . . . .	..	38.51	.	.	.	..
<hr/>						
Total Cost of Widows and Orphans . . . . .	..	..	1,352	0	0	..
Total Cost per Cent. of Widows and Orphans, in proportion to the Annual Total Cost of Paupers . . . . .	..	..	.	.	.	28.88

The number of persons in this complaint who have fallen under my observation in Lancaster is about 500, of whom 34 died : which is, upon an average, rather more than 1 in 15. Of these 168 were men, whereof have died 20, which is nearly 1 in 8 : 236 were women, whereof have died 11, which is about 1 in 22."

The continuation of similar cases of typhoid fever led to the establishment, in the present century, of a "House of Recovery," which has since merged into a fever-ward in the Infirmary near Dalton-square.

The principal conditions of a town, which counteract the most favourable natural advantages, and engender typhoid and other maladies, increasing the rate of mortality, are now generally admitted to be the retention of decaying animal and vegetable refuse in and near the inhabited dwellings. Attention was, therefore, chiefly directed to this point ; first, as it depended upon the state of the sewerage and drainage of the town ; and next, on the quantity, quality, and mode of supply of water. And having obtained from the observations and inquiries thereupon instituted, together with the instances of insufficient ventilation and overcrowding of such abodes, sufficient explanation of the causes of the state of mortality demonstrated by the foregoing tables, and of other evils deeply affecting the welfare of the poorer inhabitants of Lancaster, I shall confine this Report chiefly to these subjects.

Sewerage and Drainage.—The Surveyor of Sewers and Pavements of Lancaster had no plan of the sewerage of the town. From him I learnt that most of the streets had soughs or sewers ; that, with the exception of one street, in which the section of the sough was oval, the rest were square ; and that he continued to make them of the old square form. Edmund Sharpe, Esq., M.A., county architect and surveyor, has since supplied me with a plan of the present sewerage of the town, and states, in the letter accompanying that plan,—“ The drains are square and flat-bottomed ; the sides are built of loose rubble-wall-ing, laid in common mortar ; no pains are taken to make the joints good ; no cement or hydraulic lime is used ; and, were it not for the rapid fall of most of the streets, the sewerage would never leave the rough sides and bottoms of the drains. As it is, the stench is frequently intolerable, and the complaints incessant.

“ I send you the cost of the present ill-constructed drains, as well as that of the excellent circular tile drains, from which you will see that the increase in cost is only one-fourth more for the large size, and nothing in the smaller sizes.”*

The sewers serve to carry off the surface moisture, which is received

			s.	d.
* <i>Old Sewerage.—Cost:—</i>	Main drain	per lineal yard	6	0
	Branch-street drain	ditto	4	6
	Drains from yards, &c., ditto		2	0

The two first are made of flag or slate bottom, rubble stone sides, and rough stone covers. The small yard drains are often made without bottoms. The main is generally 2 feet 6 inches \times 1 foot 4 inches. Middle size, 1 foot to 16 inches square ; and the smaller ones, 6 inches or 7 inches square.

Estimate of New Sewerage:—Tile pipes, socket joints, with elbows, &c., complete.

		s.	d.	£.	s.	d.
4,817	lineal yards, main,	at 7	6	1806	7	6
3,970	ditto secondary,	at 4	6	870	15	0
11,330	ditto branches,	at 2	3	1274	12	0

by untrapped gratings or gully-holes, together with so much of the surface filth and refuse as is not removed by scavenging. The house-drains serve principally to carry off the waste water: but with regard to the combination of house and street drainage, the information which I was able to obtain was vague and uncertain. I have reason to believe that the instances are limited to a few amongst the better class of houses in which a supply of water has been provided and applied to carry off the most offensive refuse from their interior. But the quantity of offensive decomposing animal and vegetable substances which finds its way into the sewers has much increased of late years.

The entire contents of the sewers of the town of Lancaster, with the exception of that in Bridge-lane, are ultimately delivered into an ancient mill-stream. This begins at Dalton dam, a diverticulum of the river Lune, and, after a course of 1400 yards, terminates in the river at the lower part of the town, near the Old Bridge. About 700 yards of this receptacle of the town-sewage flows through the lower part of the town. Through the greater part of its course the current of the mill-race is very sluggish, and at high tide it is reversed, its contents being driven back towards its commencement, at the dam. By this flux and reflux the decomposing matters received into it are mixed together and agitated, their decomposition accelerated, and the escape of the miasmatic and noxious effluvia and gases promoted. The progressive growth of the town and consequent increase of the offensiveness of the mill-race, which may be compared to a prolonged cesspool, have led to its being arched over, along a great proportion of that half of its course which extends through the inhabited part of the town. The portion of the mill-race which was undergoing this expensive modification during the period of my inspection was about 72 yards in extent, and flowed through a garden extending from the residence of the proprietor, in Leonard-gate, to the Green-area. The contract price of the work was 100*l.*; but the gentleman (Mr. George Burrow) who had gone to this expense to abate the nuisance, informed me that it would cost him more money before it could be satisfactorily completed. This fact yields an approximate estimate of the expense which has been incurred in bridging over about 600 yards of the intramural portion of the mill-race; an operation which conceals, without materially abating, the evil of that sluggish receptacle of the town sewage.

Many of the wells in the vicinity of this part of the mill-race have

1,700 lineal yards, main outlet, at 9 <i>s.</i>	£765	0	0
320 gulleys, with stench traps and pipe complete, at 17 <i>s.</i> 6 <i>d.</i> each	292	10	0
	£5009	4	6

30,000*l.* worth of rateable house property, or 3500 houses at a rent of from 5*l.* to 50*l.*, the average being 9*l.* per annum. Say,

	Sewer Rate.	£.	s.	d.
850 at from . . . 5 <i>l.</i> to 7 <i>l.</i>				
850 at about . . . 7 <i>l.</i>				
500 at from . . . 7 <i>l.</i> to 10 <i>l.</i>				
500 at about . . . 9 <i>l.</i> to 10 <i>l.</i>	4 per cent. on 5000 <i>l.</i>	200	0	0
300 at from . . . 10 <i>l.</i> to 12 <i>l.</i>	Annual expenses . . .	150	0	0
300 at from . . . 13 <i>l.</i> to 20 <i>l.</i>				
200 at from . . . 20 <i>l.</i> to 50 <i>l.</i>				
		£350	0	0

3500

30,000 at 23*¼d.* in the pound, 347*l.* 16*s.*

been polluted by the soaking of its contents into the soil. It affects the cellars and foundations of the adjoining houses, and is probably a chief cause of the occurrence of typhus fever in its vicinity, as in Dam-side-street, and parts of St. Leonard-gate. At the present time the mill-race performs no other office than to intercept the currents of the main sewers (the contents of which ought to be speedily delivered at a distance from the mass of the population), and to form the medium of their gradual escape, subject to the alternations of the tidal current, into the river. The mill, for the working of which the dam and race were originally made, has long ceased to exist ; its place is shown in Speed's plan of the town, as it stood in 1610. There are no rights to be purchased : they were originally leased to the family of Dalton for 200 years ; and were rendered up at the expiration of the lease, by a representative of the family, to the Municipal Corporation.

Besides the influence of the defective structural arrangements of the present system of sewage in exciting febrile epidemics and producing the excess of mortality of the tradesmen and operatives of Lancaster below the average of a healthy town ; another cause, which operates, especially in the districts inhabited by the poorer classes, arises out of the inapplicability of the present system of sewerage to the speedy removal from such districts of the most offensive and noxious refuse. The sewers and drains are unconnected with any special water-supply or power of scouring or flushing them, and in fact, as in most other towns, they are not at present so constructed as to admit of that essential condition to their complete operation in a sanatory point of view. The instances, as before stated, are extremely rare, in which a supply of water has been provided and applied to the purpose of carrying off the excreta from the interior of the houses, and in these cases the drain usually terminates in an adjoining cesspool. The domestic refuse is thrown into the midden-stead or bog-holes, which are generally open receptacles attached to privies, and form, in the more or less close contiguity of every house in the town, a mass of decomposing and putrescent animal and vegetable matter. These centres of atmospheric pollution are emptied away at intervals of time, usually regulated by the capacity of the receptacle ; the periods varying from three months to three years or more. I was informed of some severe cases of typhus fever which had occurred in wealthy families, and had originated so soon after the emptying of such receptacles as to lead the medical attendant to infer a close connexion between that operation and the outbreak of the epidemic.

In the better class of houses, however, the offensive accumulations are usually placed far enough from the doors and windows to prevent immediate annoyance, and their more insidious and constantly deteriorating influences do not excite attention.

But it is in the parts of the town which are densely populated by the poorer classes, where the proportion of the most noxious constituents of the decomposing mass is increased, the proximity of the whole to the habitations closer, and the escape of the emanations from the alleys, courts, and yards, more difficult, that the influence of defective means of removing excreta from town dwellings in destroying the comfort, undermining the health, and deteriorating the morals of those exposed to its operation is most manifest.

In my inspection of the poorer districts of the town, I was accompanied by Mr. Charles Ricketts, resident medical officer of the Lancaster Infirmary, and occasionally by Edmund Sharpe, Esq., architect. The following selections from notes taken on the spot, are far from being extreme or exceptional cases of the state of things observed :

Chapel-court, a space about 60 feet in length and 7 feet wide, is enclosed at both ends, as well as at the sides, by houses from 20 to 30 feet high : it is entered by a covered way, about 3 feet wide and 7 feet high. The privy-accumulation or midden-stead was exposed within the court ; it contained the usual accumulation of decomposing excrementitious and other matters, the soakings from which filled a stagnant kennel traversing the court, and slowly escaped by an untrapped gully-hole, near the entry, into the adjoining sewer. The noxious emanations from these sources are greatly aggravated by the obstruction to free ventilating currents of air. The court is the occasional seat of febrile and phthisical disorders.

My medical guide conducted me to a court called *Croft's-yard*, where several cases of fever had occurred. We entered it by a covered passage, or tunnel-entry leading from St. Leonard-gate, 1 yard wide and 2 yards high, and about 20 feet in length, opening into a small square court, built up on three sides, and closed on the fourth, opposite the entry, by walls, propping up the soil of a garden above the level of the first floor of the houses. The privy and midden-stead occupied one side of this enclosed space, abutting against the first story ; its oozeings infecting the walls of the dwelling, and also contributing to the morbid character of the stagnant water which accumulates in wet weather at the bottom of the court, whence it drains off sluggishly by an open kennel to the untrapped grated opening of the sewer at the entry. The removal of the midden heap was described as a grievous aggravation of the habitual noisomeness of the confined atmosphere of this court. It is first thrown out by hand labour upon the floor of the court, then wheeled by barrows full down the narrow passage into the street, whence it is finally carted away. The farmer is willing to give 2s. in addition to the labour for this manure. The water for cleansing the court after this laborious and noisome operation is fetched from a public pump at some distance.

In *Brewery-yard*, the common passage to several tenements, communicating with Moor-lane, but no thoroughfare, an open kennel extends down the middle, widening into a large green stagnant pool, at the blind end of the court, where it is partly concealed from view by a low stone wall built across the kennel : at one end of the yard is the usual midden-stead, at the other was a colony of pigs. An underground drain extends from the street drain half-way down this yard ; but the slope of the surface carries most of the refuse by the open kennel in the opposite direction to the terminal stagnant pool. This yard is one of the noted localities of fever.

Another equally frequent source of patients for the fever ward, is a neighbouring court called *Plough-yard*, communicating with the opposite side of Moor-lane, by a narrow entry : the yard which leads off at right angles from this entry is everywhere surrounded, except at the indirect passage to the street, by houses from 20 to 30 feet in height. One privy serves all the inhabitants of this yard, besides trespassers from the street. It is situated at the blind end of the yard with an enormous

open midden-stead, emitting the usual offensive effluvia. There was a stagnant kennel along the middle of the yard, soaking through the ill-paved surface, and infecting the foundation and ground floors with its noxious damps.

My attention was called by both District Visitors and the Dispensary Medical Officers, to *Oven-house-yard*, China-lane: in the middle were two enormous middens, the ooziings from which were accumulated in stagnant pools. An operative builder, who had received an injury from a fall two years before was still slowly recovering. He had been recommended by one of the magistrates to prefer a complaint of this nuisance, but did not like to be a bad neighbour, the landlord of an adjoining public-house claiming a vested interest in the pestiferous accumulation.

The aggravation of the ills of poverty, by the defective arrangements for the removal of excreta was perhaps nowhere more strikingly manifested than in the case of four abodes in *Dye-house-lane*; where, in consequence of the confined space, the privy and ash-heaps were accumulated in the cellars. Commonly, the excuse for closed doors and windows was, the bad smell of the court; but here I found a special contrivance for keeping open the outer door, without which the tenant said, "she could not bide in the house:" "the stench at night was sometimes past bearing, especially in rainy weather." But the rent was low, 1s. 9d. per week, for three rooms, on account of the nuisance: if they could afford to pay more, they would not stay; but, as one of the tenants said, "need makes one submit." This poor woman was an almost constant patient at the Dispensary for dyspepsia and gastric irritation. The cellar accumulation often overflowed; for "it was such an awkward place, the farmers did not like the trouble of fetching it out," and the landlady had sometimes been induced by the tenants' complaint to pay for its removal.

In *Wood-yard* there are three or four surface drains, but they have no communication with the street sewer: the drainings from the middens in the *Bour's Head-yard*, and from some pig-sties, accumulate in the court, and are carried out by buckets into the street, four times a week. There is here much sickness and infantile mortality: the wife of John Huddersall had managed better than her neighbours, and had reared two out of five children. The privy accumulation was enormous, and sometimes sells for 13s., yielding eight or nine cartloads. The amount paid for soda to soften the pump water for washing, varies from a halfpenny to three half-pence per week, in the different families of the court.

A court leading out of *Mason-street*, presents an enclosed quadrangular space, about 20 feet in length, and 7 feet in width; the middle of this space is crossed by two privies and their usual open accumulations; at the sides of the court are houses varying in height from 20 to 30 feet; and each end of the court is blocked up by a house of the same height, the inmates of which houses were seldom off the Dispensary books. The Medical Officer has found the stench of this place so intolerable, as to be compelled to quit his patient as soon as possible.

In another court out of *Mason-street*, about 6 feet wide, and containing two privies, clothes were hanging to dry, and absorbing the fetid atmosphere.

A third court is below the level of the street: the floors of the houses

are always damp, and this state is greatly aggravated at high tides, when the old mill-stream receptacle of the town's sewers is forced back up the gully-holes, and floods all the yard. They had a very scanty supply of water: there I heard the common complaint that the pump was down, with the addition of the water being unfit for drinking when raised, the well having become polluted by the surrounding drainings; "it was only fit for slopping, not fit for use." The tenants have to go to a pump about a hundred yards off; with the usual tax for soda, or with the expenditure of much time and labour in getting rain water fit for washing.

The degree of domestic cleanliness, with these evils to contend against, were, notwithstanding, highly creditable to the poor women, the wives of the operatives who tenant these abode. But, too frequently, the effect of the difficulties and constant operation of surrounding annoyances—all within the scope of economical and efficient preventive arrangements—was manifest in the sordid, sickly, and querulous slatterns, into which women of originally cleanly and orderly habits had sunk, with obvious signs of habitual resort to intoxicating stimulants, combining to render the interior of their abodes as intolerable to the husband and the children as the exterior was disgusting.

On one side of Bridge-lane, the houses, in an almost ruinous condition, are piled up against the steep base of the Castle-hill, which there descends suddenly towards the river. At the summit of one of these piles, called the *Forty Steps*, I found a plateau, supporting a range of pig-sties, fronted by an area 3 yards wide, which was one mass of corruption and stench, and stood on a level with the roofs of the houses, fronting the street or lane. The feculent matter blended with the rain and land springs from the hill side, drains down and soaks into the foundations and walls of the houses in its descent. I learnt, without surprise, that the morals of the inhabitants of this locality were as low as their physical comforts.

Lime-street, parallel with the quay, manifests the usual consequences of imperfect drainage and the open privy system. No. 8, a seat of fever, receives the damp drainings through the wall, from a large midden-heap on the other side. Narrow and enclosed courts, with tunnel entries, lead from this street, most of them with the midden and privy heaps in a most pestilential condition.

I received strong testimony, from medical and other sources, of the unhealthiness of a locality inhabited by small tradesmen and operatives; called *Germany road* or *street*, which well exemplified the evils of a bad drainage system. It is in the close vicinity of the old mill stream; which here begins to receive the contents of the sewers; the whole vicinity of that sluggish receptacle of the excreta of the town has always been a noted locality of typhus and other forms of low fever. At the beginning of Germany-street, the houses join back to back with those at the end of Leonard-gate: and here my attention was first offensively arrested by a huge dung-heap in front of the tenement of a cow-keeper. In an adjoining court, the constant privy-heap at the blind end was unusually pestilential; the accumulation of the refuse of many abodes, it requires removal four times a year: the women, who take the task of cleansing after the removal, share the small profits from the farmer's purchase, which amounts to sixpence each.

In *Germany-row*—a closed court, with smaller ones communicating with it—there is an open well, supplying the inhabitants and the surrounding neighbourhood with the usual hard water. The overflowings of the well run to an open kennel in the court, which receives also the drainings of two or three privy midden-steads, and of two pig-sties: this stagnant solution soaks to the foundation and through the floors of the houses, and in rainy weather it rises so as to flow in at the doors: it finds its sluggish way into *Germany-street*, where it used to be received, with similar contributions from adjoining courts, into an open drain. This, in consequence of the representations to the Sewers Commission, of the frequency of fever, had, within a year previous to my inspection, been converted into a covered drain or sewer. It remains to be seen how far this attempt to diminish disease, by local improvement of drainage, will succeed: its value, at present, seems to be chiefly the admission by the authorities of the connexion between disease and bad drainage.

The open, and here almost stagnant mill-race, extends from *Germany-bridge*, 700 yards northward; the mud at the bottom was emitting mephitic bubbles. The inhabitants of the houses built on its west bank had supplied the Dispensary with many cases of fever; and the Medical Officer, Mr. Ricketts, observed, that in these and other maladies, when not fatal, the recovery was always slow; they did not rally or regain strength, as they would do in more healthy localities.

Parliament-street is an enclosed court, having one covered or tunnel entry, on the banks of the mill-dam, and a similar outlet into *Green Area*. Each of these openings is about 3 feet wide, and 7 feet high; they lead to a space of 14 yards long and 6 yards wide, inclosed on every side by good houses, from 24 to 30 feet in height. At one end of this inhabited shaft, or well, at the corner furthest from the covered entry, is the usual privy and midden-stead, rendered by the absence of ventilation more than usually offensive. The mistress of the dwelling next to the privy complained bitterly of the nuisance; her hectic cheeks bespoke the struggle which the constitution was undergoing: she had been very bad that night; had suffered two hours' purging; her husband (James Mackerell) had also suffered: they would leave the house as soon as they could get another. They paid for three rooms 2s. 4d. a-week. A well and good pump were situated in the middle of the court; and this expensive, but, in *Lancaster*, common mode had been here adopted to supply the inhabitants of the street with water, not only, as usual, too hard for washing, but unfit, from its offensive brackish taste, for drinking or culinary purposes: it was used only for the coarser operations of scouring the floors, the household utensils, and the yard. The removal of the midden soil, by the usual operations of digging and throwing it out into the court, and wheeling it into the street to be carted away, was referred to with looks and in language sufficiently expressive of its disgusting nature, aggravated, as it must be, by the slow dissipation of the stench in this pent-up locality. There had been fever in almost every one of the well-built houses inclosing *Parliament-street*, within the experience of the present Dispensary Resident Officer.

In *Back Cable-street*, the surface drainage was, until lately, in as noxious a state as that described in *Germany-court*; but, in consequence of the representations of the Dispensary Medical Staff, of the

frequent occurrence of fever here, a closed drain was, four months ago, carried along the front of the houses into the adjoining mill-race. The complaint at this street was chiefly of the insufficiency of the single privy for the inmates of the thirty houses for which it had been provided: here, as elsewhere, I heard of the trespassers from the street, and of the unwillingness of the younger females to go to the place. Motives of decency and morality combine with those of health and economy in urging upon the serious attention of the local authorities the advantage and importance of a system of sewerage capable of being combined with the in-door soil-pan system, as recommended and explained in the evidence of Messrs. Austin, Hawksley, and Foden.*

In Sugar-house-alley, the surface-drainage continues in as bad a state as in Germany-court; the backs of the houses open upon an enclosed area, along the bottom of which flows the old mill-race. The approach to this area is by a narrow covered passage, on entering which I was met by an indescribable kind of damp, sub-fetid emanation; at the end of the passage was a privy: the midden-heap being partly concealed in a vault or cellar, beneath the ground-floor of the house, perforated by the passage. Emerging thence, I stood upon a steep bank leading from the backs of the houses to the bed of the mill-stream; on the opposite side was a lofty wall, at each end a low arch, through which the black filthy stream was sluggishly flowing. Each arch supported houses, completing the enclosure of the area. The stream was confined to the mid-channel; at the sides it formed stagnant pools, receiving the drainings from ash and midden heaps and the out-castings from the overhanging windows. The fetid solution soaks through the foundations of the houses. When the tide flows, the mill-race, receiving the main sewage of the town, is driven back towards its source, traversing the area in its progress, and again slowly returns at the ebb. Thus the enclosed area, about forty yards in length, is ventilated chiefly by an impure atmosphere, which escapes from beneath the arches at each end at every flux and reflux of the stream. A more typical source of miasmata can scarcely be conceived.

Supply of Water.—An abundant supply of water is essential to an effective system of sewerage. Sewers and drains, it has been well observed, furnish merely the ways and vehicles for the transport of the excreta of towns. Water is the moving power or carrier, and its supply and application form an essential branch of the same subject, with the drainage of the place.

The inhabitants of Lancaster obtain their supplies of water from two sources—wells, and the roofs of buildings. The well water is brought up, for the most part, by pumps; there are a few small open wells in the poorer districts, from which water is drawn up by hand-labour and

* See First Report, vol. ii., pp. 319, 349, 414. A temporary abatement of the evil might be obtained by frequent, regular, and systematic cleansing and removal of the offensive matter from all courts, alleys, and yards, by properly appointed and responsible scavengers, the material removed being sold to defray the expense of the scavenging. The example of the small town of Dalketh encourages the adoption of such a system on economical grounds. This town contains about 5200 inhabitants. Every street, court, and alley, is regularly cleansed, and thoroughly, every week-day, and on Saturdays twice (morning and evening); the sale of the manure produces a sufficient sum to defray the whole of the expense, and leaves a balance of about 100*l.* a-year.

the bucket. The rain-water from the roofs of the dwellings is, in most cases, conveyed by spouts into cisterns or water-butts. The general prevalence of this arrangement is due to the hardness of the well or pump-water,* which unfits it for washing clothes, except by the addition of an alkali, which is usually the subcarbonate of soda; and amongst the poorer classes, where the apparatus for collecting the rain water is least efficient, and often wanting, the purchase of soda to make the pump or well water fit for washing, subjects them to a tax of one penny per week on the average. They complain also of the greater difficulty, when the spring water is thus softened, of getting out the dirt, and the quicker wear and tear of the clothes in washing, besides their being made more rotten by the soda, which also spoils or discharges the colour.

The wife of an operative, with a cleanly house and habits, stated to me that she gave sixpence a pound for the soda, and used about a quarter of a pound for each week's washing, but the majority can only afford to buy it by the quarter of a pound or ounce; and though paying dearer for it in this way, yet using less, and washing with more labour, but less efficiently, their soda tax is thus reduced to one penny or one halfpenny per week, the average being, as before stated, one penny per week. In some newly-erected blocks of cottages, built, however, on the objectionable system of back to back, the roof water is conveyed into a common stone cistern, from which the tenants draw their supplies for washing by a cock. More commonly, however, in the older courts and alleys, the roof water is either imperfectly caught in insufficient quantity in cans or buckets, held under the open spout during rain, or it runs to waste, and adds to the unhealthiness of the locality by augmenting the stagnant kennel-pools and the general dampness of the soil and atmosphere. Most of the courts, alleys, or blocks of cottages are provided with their pump: those, however, in the neighbourhood of Stone Well and Calkeld Well, including about 200 houses, are without that convenience, and the inhabitants resort to the common pumps of those ancient wells, some from a distance of 200 yards: the water thence supplied is hard.

The wells in those courts and alleys provided with a pump, yield water not only hard and unfit for washing, but frequently unwholesome. A poor decent woman, of cleanly and apparently temperate habits, in *Lucy-court*, said, that the water from the pump in that court always made her ill, griped, and purged her; and she fetched water for tea, and other culinary purposes, from the pump in *Pipe-house-yard*, a distance of about 250 yards. The well in *Lucy-court* was polluted by the immediate vicinity of the midden-stead of the court, receiving the privy soil, which was allowed to accumulate in great quantity, not being removed oftener than once or twice a year. Far from being infrequent were the complaints that "the well was down," or the pump out of repair. In one court, observing a chain across the pump handle, the cause was stated to be, that the landlord having refused to repair the pump, the tenants of the court had agreed to get it done at sixpence each. The repairs were made and paid for by those who had advanced

* Mr. Wilson, chemist, found in the water from his own well in Great John-street, 20 grains of calcareous and other impurities in half a pint of the water.

the needful sum—the small capitalists of the court. The defaulters were “locked out” of the use of the pump, till they had paid their quota of the expense, or had wearied out the privileged tenants by incessant squabbling.

These details may be deemed trifling, but they contribute to demonstrate the various evils of the present system, and become important when the ascertained cost at which good water, fit for every purpose, might be brought abundantly and conveniently into the dwellings of the poor,* is contrasted with the expenses and other evils involved in the present incomplete and inconvenient supply of water, of so hard a quality, as to be unfit for one of its most important applications.

In the first court leading out of *Monmouth-street* there is no pump or well; the only supply of water is from the roofs, and this is very partially collected. Most of the tenants complained of having neither hard nor soft water. Considering the trouble and labour, the colds caught in bad weather, and the wear of shoes, incident on having to fetch the water from a distant well, and the present expense of soda in making it fit for washing, one of the tenants (Mrs. Sanger) thought, that if good, drinkable, and soft water, were brought to her house by a pipe, she would not mind paying threepence a-week: the rent of her tenement was 2s. 4d. per week. The next-door neighbour, to secure a supply of rain water, which, nevertheless, had often failed her during

* See First Report, evidence of Mr. Hawksley, vol. ii., pp. 38, 47. By way of contrast I subjoin the following estimate of the expense, in Laneaster, of the pump and well for obtaining the supply of the hard water:—

	£.	s.	d.
Cost of making a stone well complete, at 14s. per lineal yard, average } depth 14 yards	9	16	0
Lead pump and wood frame	7	0	0
Stone trough complete.	1	0	0
	£17	16	0
Average cost of annual repairs	0	5	0

Number of pumps and wells in the town, 1237.

Mr. Edmund Sharpe, to whom I am indebted for the above estimate, informs me that about 50 of the above pumps are not in use from various causes, as “out of repair,” “water bad,” &c.

The following gives the expense of the existing apparatus for collecting the rain water, exclusive of the roof-conduits and spouts:—

<i>Water Butt.</i>				
	£.	s.	d.	
Average cost	1	0	0	500 houses have lead eisterns.
Annual repairs	0	7	0	200 houses have stone eisterns.
Will last	12	years.		1000 houses above 10 $\frac{1}{2}$ l., with each a butt.
Number in use	1850			850 houses under 10 $\frac{1}{2}$ l.; 425 of them have each a water-butt; 425 have one to two houses.
				850 houses under 7 $\frac{1}{2}$ l., with one butt to four houses.
<i>Lead Cisterns.</i>				
Average cost	£10	10	0	3400 Total number of houses.
Number in the town	500			
<i>Stone Cisterns.</i>				
Average Cost	£8	8	0	Average number of weeks' drought &c.—
Number in the town	200			Summer 6
				Frost 2
				— 8 weeks.
				Price of water during drought, 1d. per 9 gallons.

the present dry summer, had invested fourteen shillings of hard earned savings in a second-hand butt.

Near the blind end of this court stood the common privy, with the usual enormous accumulation of ash and midden refuse. It was removed by hard labour, the wheelbarrow and eart, once or twice a year; the smell at such times being most offensive. A stagnant kennel surface drain, receiving oozings from the midden-stead, the slops from the houses, and the waste roof water, communicated with an untrapped gully-hole at the narrow entry to the court. I was not surprised when the Dispensary Resident Medical Officer, detailing his experience of practice derived from this locality, pointed out one of the houses as having been the seat of a series of cases of scarlet fever of a low typhoid type, fatal to one of the inmates, an adult, who had been attacked at a period when his labour had become most productive to the public, and important to his family.

In *Pitt-street*, the inhabitants complained that the pump was out of order, and that the water was bad and unfit for culinary purposes, when raised by much labour; there were no means for collecting the rain water in this street. The well water was used for washing clothes, after the addition of soda, for which each family in this street paid on the average one penny per week.

There are three inhabited cellars in this street.

The privy receptacles were in front of the houses, and brim-full: they are emptied about once in two years.

In *Oven-house-yard*, *China-lane*, I found lamentable instances of the difficulties of obtaining a supply of soft water for the indispensable need of cleanliness. One poor woman, upon interrogation, with some reluctance, pointed out an empty window pane on the level of the floor of an adjoining yard, through which she sometimes put her little boy at night, to abstract a supply from the water-butt there. At other times she got it from the Castle ditch, by letting down a bucket from the terrace, at a height of about 30 feet. This is not an uncommon practice with the poor women in the neighbourhood of the Castle; the part of the ditch not bounded by the terrace is railed in to preserve the water for the service of the jail. Soft water is sold in this neighbourhood to the poor who can afford to buy it, at a penny for three cans full.

James-street is long and narrow, with an open drain, and bears, at the Infirmary, the character of an unhealthy locality. *Barrow's-court* leading out of an offset from this street, has furnished cases of fever from No. 9, at the back of which house there is a huge midden belonging to the stables of the Fleece Inn. The mother of the family had been lately carried off by typhus. As exemplifying the appreciation of the advantage of a good supply of water, the tenant, though aware of the unhealthiness of the place, continues, because the landlord has provided a large stone tank for the reception of the rain water; it is raised by a pump from the tank.

In *Plough-yard*, already cited, as exemplifying the evils of the present sewer system, the means for collecting the rain water are very insufficient. The water from the pump is made usable for washing by the usual addition of soda. The tenant of two rooms in one of the houses rented at 1s. 10d. per week, paid three halfpence per week for

soda for washing, when there was no rain water to be had. Another bought a pennyworth of soda for her week's washing.

Crooked-billet-yard communicates with the lower end of Church-street; is a similar, but narrower, *cul-de-sac* than Plough-yard, and has the privy and offensive midden-stead at the blind end: the contents are removed about three times a-year, the farmer paying 2s. 6d., which the inhabitants share amongst themselves. They complained of its offensiveness. One abode, of which the door and only window opened close against the midden-heap, had supplied the Dispensary with an interesting but fatal case of purpura hæmorrhagica, in a child: the mother, in the same abode, had been carried off by puerperal fever of the typhoid type. Here, after the usual complaints of the quality and deficiency of water, a tenant of the court, in answer to the question of what it would be worth to her to have a house supply of good water, thought that "twopence a week would be what most of 'em would be glad to give for such a comfort." This court had surface drainage only.

In *Oven-house-yard*, St. Leonard-gate, there is no pump, and they have a long way to go for water; and what they get from Stone Well or Calkeld Well is hard, and requires soda for washing. This yard is accessible by a narrow entry, close to which stood the usual open midden-heap; it leads to an area, about 30 feet by 20 feet, which is principally occupied by a stagnant mass of mud and green-mantled water. On one side of this were ten pig-sties, and the rest was surrounded by dung-heaps, of which I counted six. The central pool receives the fetid oozings from these accumulations of filth; and the whole forms a typical specimen of the fertile source of febrile miasmata, in the precincts of a populous neighbourhood.

Dam-side-street is another irregular enclosed space, entered by a covered way which we could not pass without stooping: it contained several midden-steads and pig-sties, and is a noted seat of fever. It is not provided with a pump: the inhabitants fetch their hard water from Mason-street, and their rain water, when they can get it, which is a rare occurrence, from Swarbrick's, in Germany-street; most times they have only the hard pump water, and those that can afford it, buy a halfpenny or penny worth of soda, which serves only for one batch of washing.

In *Croft's-yard* there is no pump, and the means for catching the rain water are very imperfect. Cleansing of the court always requires the preliminary labour of fetching the water from the Stone Well; and, at the period of the removal of the midden-heap, "they are all day in getting it any way decent." The usual soda tax is paid at most times of the year to make the Stone Well water fit for washing. One family had left the yard because they were always ailing: their successors are now in a sickly state. The advice of the Medical Officer to these, his habitual patients, was uniformly to leave a place which had been an almost constant channel for the flow of the Dispensary charity fund, in the shape of their drugs, and the time and skill of their Resident Officer.

Ventilation.—When we consider the proportion of putrefactive and pestilential emanations which must be mingled with the atmosphere of confined courts and yards like those which have been described, it is

obvious that any of the modes of ventilation that have been devised and recommended to be introduced into the construction of the dwellings of the poor, by apertures, regulated or otherwise, in the windows, walls, and chimneys of dwellings so located, must increase the nuisance to the inhabitants by the introduction of currents of such offensive atmosphere, so long as the system of open privies and infrequent removal of the accumulated excreta and refuse is suffered to continue in operation.

Pure air is the essential condition of successful ventilation. An arrangement of dwellings admitting full and free currents of the atmosphere is the main requisite for the healthy respiration of the inmates, and should be provided for in all sanatory regulations for the future erection of abodes for the poorer classes. The improvement of the air in the existing dwellings when they are so arranged as to obstruct pure atmospheric currents, by the introduction of partial and domestic contrivances for ventilation, demands as a requisite preliminary, such a system of constant, speedy, and complete removal of decomposing animal and vegetable refuse as is now in operation in the town of Dalkeith (see *ante*, p. 225), or as that still more effectual and economical one which has been described in the evidence of Messrs. Foden,* Hawksley,† and Austin,‡ and which is actually in successful operation in a densely inhabited part of the locality now reported on—the County Gaol, to which I shall presently advert. With regard to the confined parts of the town inhabited by the poorer classes, I subjoin some of the instances in which the necessity for such an essential preliminary, connected with the flushing system of drainage and sewage, was forced upon my attention during the inspection made for the present Report.

In *Victoria-place* the first story of the houses is below the level of the opposite field, and about 7 feet below the wall supporting the soil of that field: the length of the place or passage is 40 feet, and it is blocked up at each end. The families living here are mostly of the better class of operatives. No. 7 is built over a stable and pig-sty, and has a great accumulation of refuse beneath the inhabited part of the house. The former inmates of this tenement were always ailing: their successors had been six weeks in the house, and complained that they were forced to keep the windows shut to keep out the stench.

The entry to a thickly populated *cul-de-sac* called *Railway Inn-yard*, is a covered passage two feet wide. *Cardwell's-yard* is a similar inhabited sunken shaft. The ventilation in both is most defective, and their atmosphere, polluted by the common open privy and open drain system, is unfit for admission into human abodes. Both localities had supplied the Dispensary with cases of fever and phthisis. Mr. Ricketts had had fever cases also in *Black Cat-yard*, which is five feet wide, and with an atmosphere requiring the same thorough system of disinfection.

Fleet-street is an enclosed area of a few yards square, entered from Union-square by a passage two feet wide, and 20 feet high. In this limited space were two privies and midden-heaps. The inhabitants carefully shut out the atmosphere which receives the emanations.

* First Report, vol. ii. p. 349.

† Ibid, 319.

‡ Ibid, 414.

Lawson's-yard, inhabited by a higher class of operatives, was clean and flagged, but exhibited the evils of a pent-up atmosphere: it is narrow and closed at both ends, except the tunnel entry from Market-street. I was struck by the dank smell on entering it. My medical companion stated that he had noticed that of sulphuretted hydrogen in his attendance on the sick in this yard.

Several courts led by narrow covered ways from *Henry-street*: only one was sufficiently open to admit the purifying currents of air; the others were confined and filled by a more or less fetid atmosphere. Here was repeated the common complaint of the pump out of repair, and the great labour of raising water for culinary purposes. The proximity of the canal affords the supply of soft water for washing.

The obstruction to a free admission of solar light which is, likewise, caused by the close collocation of dwellings, as has been described, adds to the force with which the more directly deleterious influences operate upon the inhabitants, and especially upon convalescents, infants, and young children.

In regard to the close courts yards, and alleys, so common in old towns, and so difficult to be effectually altered without destruction of property, the substitution of the soil-pan and flushing system for the open privies and accumulations appears to be the essential preliminary step to ventilation improvements. The atmosphere of the rooms, now often purposely pent up, is however, in some instances, rendered still more deleterious, especially during the hours of sleep, by the overcrowding of the apartments; of which I met not infrequently with examples by no means warranted or excused by the circumstances of the occupant of such abodes.

In *Factory-hill*, for example, there is a block of eighteen cottages, built back to back. Mr. Ricketts, who had here attended some bad cases of children's diseases, drew my attention to the uncleanly state of some of the abodes; and Mr. Jackson, the mill-owner, complains that he could not prevent the habit of over-crowding. Two or three families would stow themselves into a space fit only for the wholesome occupation of one family; and, though in the receipt of full wages, would thus save expense of rent at the expense of health, in order to gain means of indulging in excesses calculated more directly to undermine the constitution.

While, however, a general system of baneful extraneous causes continues to operate in diminishing or destroying the domestic comfort of the working classes, by polluting the atmosphere surrounding their dwellings by noxious emanations, which tend directly to depress the nervous system, no very sanguine expectations can be entertained of their improvement. The great and primary evil must first be amended by efficient sanitary regulations.

Fires.—Among many secondary evils and inconveniences which attend the present mode of supply of water in the town of Lancaster, its inadequacy to meet the emergency of conflagrations prominently suggests itself. "The town," says the historian above quoted, "has been long famous for the great quantities of mahogany furniture which have been made in it for home use and exportation. Mr. Gillow's

extensive warerooms, stored with every article of useful and ornamental furniture, are well worth the attention of the stranger, as they are said to be the best stocked of any in this line out of the metropolis.”* I was assured by the present senior partner of the firm, that in the event of a fire breaking out in the richly-stored premises in Church-street, the only supply of water which could now be had was from the pump and water-butt, and from those in the yards and passages of the neighbouring houses.

Public Walks.—On the rising ground to the east of the town, near that part which is most densely inhabited by the factory population, the Corporation possesses land, called Freeman’s Wood, which has been planted and walled round for the protection of the young trees. This might be laid out, at a comparatively small expense, as an ornamental park for public recreation. It could not but prove conducive to the sanatory improvement of the labouring population generally, and more especially of the manufacturing class, which the tables of mortality show to have, at present, the lowest rate of life. The higher ground, near the race-course, would form, if properly drained, a most advantageous site for athletic games and exercises, which are too little encouraged amongst the younger artisans and operatives. These, and other accessory means of improving the sanatory state, can scarcely, however, be expected to improve the rates of mortality, whilst the great and primary evils remain in full force.

Remedial Suggestions.—The most obvious, and apparently the only efficient remedy for the circumstances which mainly affect the sanatory condition of the town of Lancaster, depends upon the acquisition of a supply of water, not merely in quantities sufficient for the ordinary domestic wants of the inhabitants, but a concentrated supply, capable of being conveyed into the interior of houses so as to be applicable to the removal of the most offensive kind of refuse, and of conveying the same, by proper house-drains, to sewers, so constructed as to admit of effectual scouring by such application of water-power.† The whole refuse of the town, thus speedily and effectually carried off by a flushing system of house-drains and sewers, ought, in order to meet the exigencies of the agricultural neighbourhood, as well as to ensure a return for capital expended in such sanatory improvements, to be conveyed by the main sewer into reservoirs, at a due remoteness from the town, in order to its subsequent removal and application to the increase of the productiveness of the surrounding land, which might, if properly drained, be then maintained constantly in a high state of fertility.

* An Historical Account of the town of Lancaster, 8vo., 1807, p. 64.

† Mr. Sharpe, county architect and surveyor, in a letter addressed to me since my survey of the town, says, in reference to such a supply of good soft spring-water:—“I am unable to give an estimate of the cost of a perfect supply, but I am satisfied that it could be obtained at a very reasonable rate. The lower part of the workhouse field would form an excellent high-level reservoir, and the Freeman’s Wood, immediately below it, a very good site for a low-level supply. Both would be fed by small streams, and would be supplied from large surface drainage reservoirs on the Lancaster or race-course side of the base of Clougha.” The masses of the sandstones of the carboniferous series on which the subsoil of the town rests, here rise to the surface and form the base of this hill, the level of which base is higher than the summits of the church and castle towers which crown the hill on which Lancaster is built.

I have been induced to step thus far beyond the immediate and proper object of this Report, which is the exposition of the chief causes affecting the sanatory condition of Lancaster, and to suggest the line of remedial operation, because the local authorities, responsible for the health of the town as far as it depends on proper sewage and drainage, have an opportunity of judging of the efficiency of the improved system recommended, by its successful operation at the County Jail, where it has been adopted by the authorities who regulate the sanatory condition of that establishment.

All the excreta of the population there aggregated, and immured upon the summit of the hill on which the town is built, are speedily and effectually removed by the application of water-power, and conveyed to closed reservoirs, to be subsequently applied to the purposes of agriculture.

The following are the sources whence a water supply, equivalent to the above important service, as well as to the ordinary exigencies of cleanliness, is obtained:—

Debtors' Yard.—Spring water from the well in the centre of the yard, and from a well near the Well Tower. Rain water from a large tank at the upper end of the yard.

Male Crown Side.—Spring water from the well in the Chapel yard, worked by the tread-wheel. Rain water from a tank in the Lungess Tower; from two tanks in B ward; from a tank in each of the wards A, C, D, E, and F; and with water, condensed from the steam-pipe, passing through the wards, in the yard of ward G and H.

Penitentiary, or Females' Ward.—Spring water from a well within the building. Rain water from the Castle ditch, by a forcing pump, from two tanks on the roof, and from a large tank in the yard.

Female Debtors' Ward contains a rain water tank.

Keeper's House.—Spring water from a well in the Well Tower. Rain water from a tank under the house.

The inconveniences of the flushing system of sewage adopted in the jail, of which I heard complaints in the town, arise entirely from the partial application of the system, from its being confined to the jail and stopping at the summit, instead of extending to the base of the hill, and over the whole natural drainage area of the town.

The contents of the flushed drains and sewers of the jail, instead of being delivered at a distance from the town habitations, are arrested and accumulated in two enormous cesspools, excavated just outside the walls of the jail, on the summit of the hill, whence the matter is removed and carried off at brief intervals. The constant and frequent repetition of such an operation within the town, is, of itself, a nuisance, and opposed to the salubrity of the atmosphere. But the cesspools were, likewise, complained of by the inhabitants of the streets in the immediate vicinity, on account of the occasional overflow of the liquid contents which found their way into both the kennels or surface drains, and into the sewers; and the effluvia from the untrapped gratings were stated to have been thereby rendered much more noisome and offensive.

The authorities having charge of the town drainage and sewage, at the period of my inspection of the sanatory state of Lancaster, had refused to permit the authorities having charge of the upper part of

the same natural drainage area, to use the sewers which constituted the proper outfalls. At different previous periods, the subject of a combined plan of sewage, of both town and castle, had been under discussion between the two authorities, but has not, hitherto, led to so desirable a result.

With the present mode of water supply, the extension of the flushing system of drainage and sewage over the entire drainage area of the town, is, in fact, impracticable. Equally impracticable, without a different and improved mode of water supply to the town is the substitution, for the present open-privy and putrefactive-accumulation system in the courts and alleys inhabited by the labouring population, of the plan above recommended, on the evidence of Messrs. Hawksley, Foden, and Austin, and which is in successful operation at the commencement of the natural drainage system of the town, namely, at its summit.

The general manifestation of a hearty sympathy on the part of the influential inhabitants of Lancaster with the welfare of the humbler classes, and the strong expressions of interest in the subjects of the present inquiry, and of desire for the improvement suggested by it, justify the expectation that that which has been done on principles of economy, for the sanatory condition of the inmates of the jail, will be attempted, its equal economy and efficiency being made manifest to the authorities, in behoof of the health, the cleanliness, the domestic comfort, and the morals of the honest and industrious poor.

In the town of Nottingham, more than 5000 houses of the labouring classes are supplied with filtered water, fit for every purpose, at high pressure rate, for which the rate of one penny per week per house is remunerative: this has been followed by great increase of personal cleanliness and decrease of disease. I met with many instances among the analogous classes in Lancaster, of expressed willingness to pay twice that sum, or more, for the like advantage; and, at the same time had evidence, that an expense equal to that paid for water, by the poor at Nottingham, was in most cases incurred by the poor at Lancaster, for improvement of their present scanty supply of hard water. The effect of such scanty supply, obtained with out-door labour, sometimes at a distance and with much difficulty, with subsequent superadded expense to render the water usable for washing by addition of an alkali injurious to the articles washed—must be to diminish, if not destroy, habits of cleanliness, both of attire, person, and abode.

